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Translation

PATENT COOPERATION TREATY

PCT/JP2003/016515

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|---|---|---|
| Applicant's or agent's file reference<br>50308746 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No.<br>PCT/JP2003/016515 | International filing date (*day/month/year*)<br>24 December 2003 (24.12.2003) | Priority date (*day/month/year*)<br>26 December 2002 (26.12.2002) |
| International Patent Classification (IPC) or national classification and IPC<br>G02B 6/12 | | |
| Applicant<br>JAPAN SCIENCE AND TECHNOLOGY AGENCY | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

| | |
|---|---|
| Date of submission of the demand<br>14 June 2004 (14.06.2004) | Date of completion of this report<br>14 March 2005 (14.03.2005) |
| Name and mailing address of the IPEA/JP<br><br>Facsimile No. | Authorized officer<br><br>Telephone No. |

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/016515

## I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-17, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages 7-9, 11-13, 18, 21, as originally filed
pages _____, as amended (together with any statement under Article 19
pages 19-20, 22, filed with the demand
pages 6, 10, 14, 17, 23-25, filed with the letter of 02 December 2004 (02.12.2004)

☒ the drawings:

pages 1-7, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☒ the claims, Nos. 1-5, 15-16
☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
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**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 15-22

because:

☐ the said international application, or the said claims Nos. _____ relate to the following subject matter which does not require an international preliminary examination *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. _____ are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for said claims Nos. 15-22 .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 6-14, 23-25 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 23-25 | YES |
| | Claims | 6-14 | NO |
| Industrial applicability (IA) | Claims | 6-14, 23-25 | YES |
| | Claims | | NO |

2. Citations and explanations

Document 1: WO, 98-53535, A1 (Northwestern University), 26 November, 1998 (26.11.98)
Document 2: WO, 01-020379, A1 (S. T. Ho), 22 March, 2001 (22.03.01)
Document 3: JP, 5-323390, A (Nippon Telegraph and Telephone Corp.), 7 December, 1993 (07.12.93)
Document 4: WO, 98-57207, A1 (Massachusetts Institute of Technology), 17 December, 1998 (17.12.98)
Document 5: (So Hoshoku, et al.), Papers Prepared for the 63rd JSAP Annual Meeting of Autumn 2002, The Japan Society of Applied Physics, 24 September, 2002 (24.09.02), Vol. 3, pages 916, 25p-YA-17
Document 6: (A. Talneau, et al.), Applied Physics Letters, 28 January, 2002 (28.01.02), Vol. 80, No. 4, pages 547-549
Document 7: (I. Ntakis, et al.), 2002 IEEE/LEOS Annual Meeting Conference Proceedings, 10-14 November, 2002, Vol. 2, pages 518 and 519
Document 8: (M. Tokushima, et al.), Electronics Letters, 22 November, 2001 (22.11.01), Vol. 37, No. 24, pages 1454 and 1455

Claim 6

The subject matter of claim 6 does not appear to involve an inventive step in view of documents 1, 3, 4, 6 and 7 cited in the ISR, and document 8 newly cited.

A constitution wherein the distance between an input waveguide and an output waveguide except for their parts optically connected with each other is larger than the distance between the said parts by forming a curve in the said output waveguide is a well-known technology in the field of waveguide frequency filters, as described in documents 1, 3 and 8.

Accordingly, a person skilled in the art could have easily created a constitution wherein, in an output waveguide of a frequency filter that is made of 2-dimensional photonic crystals having point defects, described in document 4, the distance between an input waveguide and such output waveguide in an area where point defects are not formed, except for the parts of the waveguides optically connected with each other, is larger than the distance between the input waveguide and the output waveguide in the said parts in an area where point defects are formed, by forming a curve in the said output waveguide, based on the above-mentioned well-known technology described in documents 1, 3 and 8. In that constitution, a person skilled in the art could have, as a matter of design variation, normally set the range of frequency in high transmittances of the curved parts so as to encompass the resonant frequencies of a resonator so that the light of the frequencies drawn out through the said filter could not be damped.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of : V

(The applicant claims in its written reply of 2 December 2004 that setting the range of frequency in high transmittances of the curved parts so as to encompass the resonant frequencies of a resonator would make it hard for noise-producing electromagnetic waves to pass through. Claim 6, however, does not describe that the curved parts have low transmittances for the frequency range that makes noise, so the claim in the written reply cannot be accepted. Even if the above-mentioned effect claimed by the applicant were accepted, that effect would be within the extent that a person skilled in the art could have predicted because an optical waveguide made of 2-dimensional photonic crystals having linear defects does not have even transmission characteristics over frequencies but has frequency-selective transmission characteristics (see documents 6 and 7).

Claims 7-14

The subject matters of claims 7-14 do not appear to involve an inventive step in view of documents 1 and 3-7 cited in the ISR and document 8 newly cited.

Document 5 describes (i) that the point defects are donor-type defects in a wavelength filter made of 2-dimensional photonic crystals, and (ii) a heterogeneous structure of a waveguide connected in series in the longitudinal direction with parts having different resonance frequencies from that of the waveguide.

Accordingly, a person skilled in the art could have easily made the output waveguide of the wavelength filter made of 2-dimensional photonic crystals having point defects, described in document 4, into the heterogenic structure described in document 5.